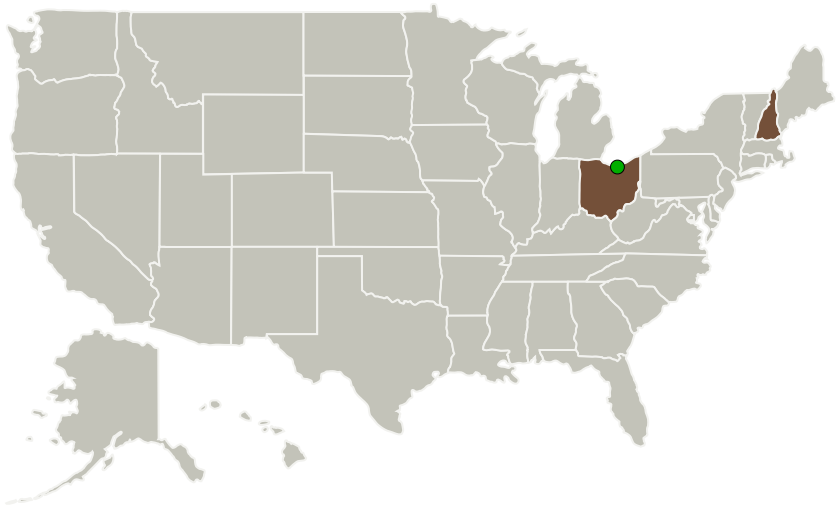
A Novel Plasma-Based Compressor Stall Control System, Phase I

Completed Technology Project (2013 - 2013)

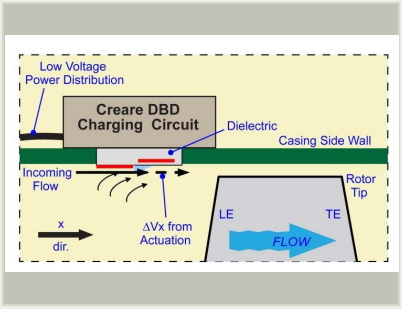
Project Introduction

Modern aircraft gas turbine engines utilize highly loaded airfoils in both the compressor and turbine to maximize performance while minimizing weight, cost, and complexity. However, high airfoil loading increases the likelihood of flow separation at lower mass flow rates. Dielectric Barrier Discharge (DBD) plasma actuators have been shown to be a very promising technique for compressor stall control. DBD devices can either be installed directly on rotor/stator surfaces or the compressor end walls to control rotor tip flow. A fundamental challenge in driving DBD actuators is providing appropriate electrical waveforms to the devices. Creare proposes the development of an innovative DBD actuator charging circuit topology which enables (1) low voltage DC power distribution, (2) a modular approach to achieving total power delivery, (3) use of commercial-off-the-shelf (COTS) components, and (4) resolution of impedance matching issues associated with other DBD charging circuit topologies.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Creare LLC	Lead Organization	Industry	Hanover, New Hampshire
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



A Novel Plasma-Based Compressor Stall Control System

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Primary U.S. Work Locations	
New Hampshire	Ohio

Project Transitions

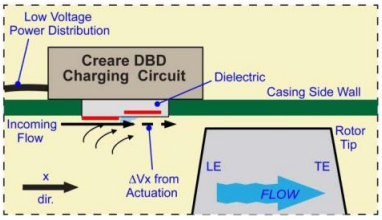
May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140370)*

Images



Project Image
A Novel Plasma-Based Compressor Stall Control System
(https://techport.nasa.gov/image/132611)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Creare LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Richard W Kaszeta

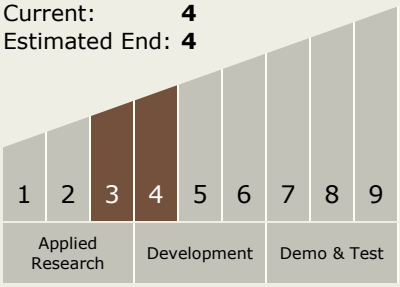
Co-Investigator:
Richard Kaszeta

A Novel Plasma-Based Compressor Stall Control System, Phase I

Completed Technology Project (2013 - 2013)

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.5 Propulsion Flowpath and Interactions

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System